

March 5, 2013



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VIA ECFS

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: WC Docket No. 12-353; RM-11358

Dear Ms. Dortch:

Pursuant to the Public Notice released by the Federal Communications Commission ("FCC" or "Commission") in the above-referenced proceedings on February 4, 2013, Overture Networks ("Overture") files these comments in support of the "Requested Remedy" in TelePacfic *et al.*'s January 25, 2013 letter requesting that the Commission "refresh the record" and make certain changes to its copper retirement rules.¹

As TelePacfic *et al.*'s January 25, 2013 letter explains, carriers are provisioning affordable high-speed broadband services to business of all sizes over copper loops using Ethernet over copper technologies ("Carrier Ethernet"). Overture is a leading developer and manufacturer of Carrier Ethernet products for communications service providers that are used to provision such affordable broadband services. Our customer base includes 7 of the top 9 ILECs and 8 of out the top 9 CLECs in the U.S., as well as many Tier 1 / Tier 2 international carriers. We are submitting these comments to provide our perspective, as an equipment provider, on the Ethernet over Copper (EoC) market and technology.²

It is Overture's conviction that Ethernet over Copper for delivery of IP services is a critical component for the Commission's National Broadband Plan and its goal to "Undertake a comprehensive review of wholesale competition rules to help ensure competition in fixed and mobile broadband services," and that as a result the Commission must ensure that copper loops are available for the U.S. to remain competitive in the global market.

Executive Summary

To help the Commission understand the importance of the issue of Copper retirement, these comments will show that Ethernet over Copper is a significant, widely deployed and growing next generation technology that is critical to the Commission's National Broadband Plan and the

¹ Letter of US TelePacfic Corp. *et al.* Requesting Commission to Refresh Record and Take Expedited Action to Update Copper Retirement Rules, WC Docket Nos. 10-188, 12-353; GN Docket Nos. 09-51, 13-5; RM-11358 (filed Jan. 25, 2013) ("TelePacfic *et al.*'s January 25, 2013 letter").

² This document is an update and expansion of our filing on December 7, 2012. *See* Letter from Jeff Reedy, Co-founder and Chief Strategy Officer, Overture, to Marlene H. Dortch, Secretary, FCC, GN Docket Nos. 09-47, 09-51, 09-137, and RM-11358 (filed Dec. 7, 2012).

migration from legacy to Ethernet/IP services. In particular, it shows that ***Ethernet over Copper is a means to deliver IP, and not a legacy TDM technology.***

To support this position, we answer the following questions:

- Can copper loop facilities be used to transmit non-TDM, IP-based services?
- How does Ethernet over Copper accelerate adoption of IP?
- What happens when a business decides to transition from legacy services to IP services delivered over Ethernet?
- Is Ethernet over Copper fast enough?
- Is Ethernet over Copper widespread?
- How big is the Ethernet over Copper market, and how fast is it growing?
- Are Ethernet over Copper and Fiber mutually exclusive?
- How does Ethernet over Copper promote innovation?
- Does Ethernet over Copper accelerate job growth?
- What is happening outside the U.S.?
- What happens if copper is retired prematurely?
- What other resources are available on using Ethernet over Copper for delivery of IP services?

Can copper facilities be used to transmit non-TDM, IP-based services?

Yes. Today's advanced Ethernet over Copper is being used to deliver a wide variety of advanced IP services. Stan Hubbard of *Heavy Reading* observed that:

Service providers worldwide are using Ethernet as means to drive down cost and deliver business-class services. With the advent of Mid-Band Ethernet [over Copper], these service providers are now utilizing standards-based technology to extend the Ethernet service edge of their networks beyond fiber. With Mid-Band Ethernet, they are able to more efficiently deliver high-bandwidth, reliable Ethernet-based services while they wait for the economics to make sense for trenching new fiber. Mid-Band Ethernet allows operators to receive a quick return on invested capital while testing market demand before making more costly investments in fiber.

As service providers deploy, they've come to realize that Mid-Band Ethernet is much more than a mechanism to deliver a fatter pipe. It can be used to deliver a variety of business services, serve as a conduit for a suite of managed services of voice, video and data, become an integral part of a wholesale offering, or backhaul traffic from residential and/or wireless services.

No matter how it's being used, we're seeing a dramatic uptake in service provider adoption of Mid-Band Ethernet in large part due to its unique service creation capabilities. We expect this trend to continue and look forward to watching the market evolve.³

³ Stan Hubbard, Heavy Reading, The Complete Executive Handbook: SELLING MID-BAND ETHERNET SERVICES THE CARRIER'S GUIDE TO SELLING MID-BAND ETHERNET SERVICES TO ENTERPRISE CUSTOMERS, at 1 (provided as Attachment 1, hereto).

How does Ethernet over Copper accelerate adoption of IP?

Carrier Ethernet is emerging as the technology of choice for transporting data, voice and video IP services. Carrier Ethernet is a packet technology that enables systems to take advantage of silicon economics in switching and processing. Carrier Ethernet can be delivered over any media, including fiber or copper. Ethernet over Copper is a widespread technology deployed by both ILECs and CLECs to complement their Ethernet over Fiber offerings. It is important to have access to both technologies, since fiber is deployed to about 32% of business locations with greater than 20 people, according to Vertical Systems Group (see Figure 1).

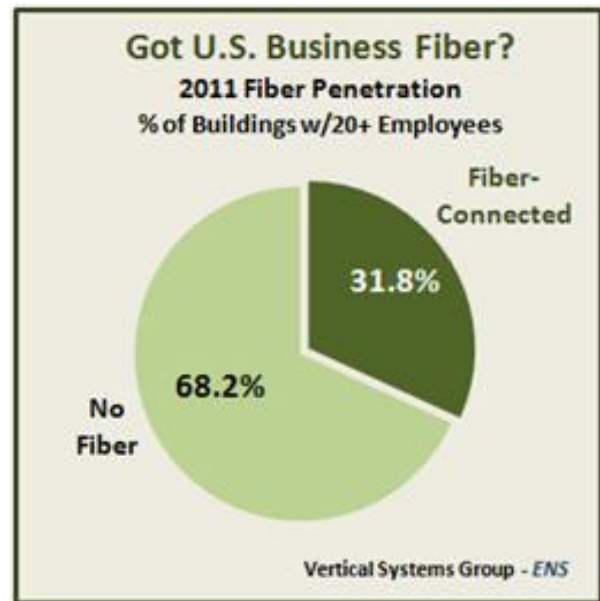


Figure 1 - Deployment of Fiber

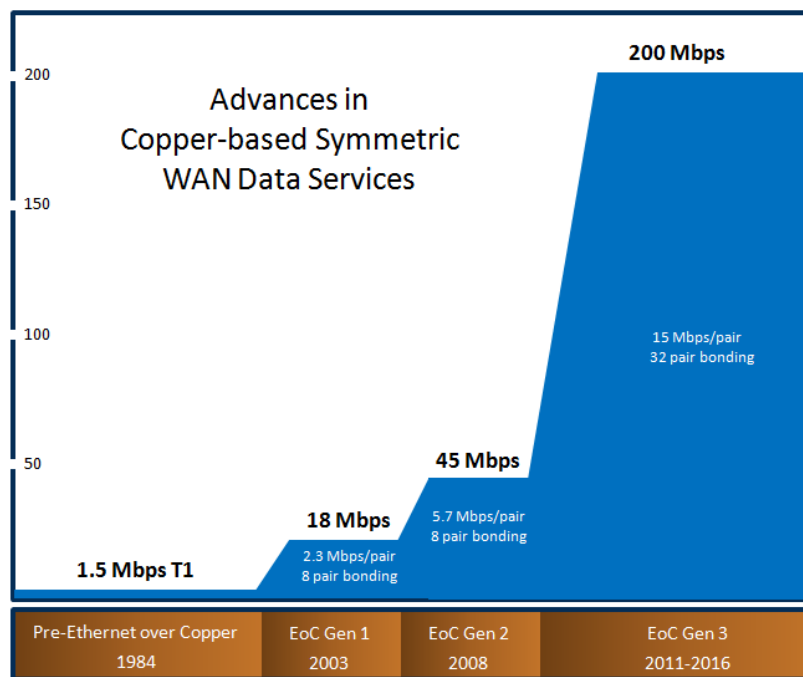
What happens when a business decides to transition from legacy services to IP services delivered over Ethernet?

Regardless of whether it is a single location or multi-location business, a business that cannot get Ethernet/IP to all of its sites will not make the change to next generation services and will stay with the legacy services. Because Ethernet over Copper can fill in the gaps for 68% of business locations, having access to copper loops is critical for accelerating the adoption of IP-based services. Ethernet over Copper is the way to bring IP to the mass market.

Is broadband provisioned over Ethernet over Copper fast enough?

Ethernet over Copper is a viable technology for delivering high-speed broadband services at bandwidths ranging from 10Mb/s to over 100Mb/s. Two approaches can be used to provision

such high-speed broadband services over a copper loop, which contains a pair of copper wires, including: 1) symmetric G.SHDSL and 2) asymmetric DSL.



Source: Overture Networks

Figure 2 – Ethernet over Copper Advances

Symmetric G.SHDSL provides the same bandwidth in both directions. Advances in DSL modem technology now enable 15Mb/s per copper pair at up to 2,000 feet. Performance degrades gracefully and speeds greater than 4Mb/s per copper pair at up to 6,000 feet are common.

Typically, when Ethernet over Copper is used, bundles of 4, 8 or more copper pairs are logically bonded to create a high-speed pipe. Service providers routinely offer services ranging from 40Mb/s to 100Mb/s and in some cases have deployed 200Mb/s using G.SHDSL (see Figure 2).

The other approach used for Ethernet over Copper is asymmetric DSL, such as ADSL2 or VDSL2. With VDSL2, downstream speeds of over 20Mb/s per second on a single copper pair are possible up to 6,000 feet. When copper pairs are bundled, a noise cancellation technique called vectoring enables service delivery of several hundred megabits per second at useful distances.

Is Ethernet over Copper widespread?

Ethernet over Copper has become a mainstream technology for most ILECs and CLECs. ILECs with Ethernet over Copper service offerings include: AT&T, CenturyLink, Windstream, Frontier, and TDS. CLECs deploying Ethernet over Copper include: XO, Alpheus, Integra Telecom, Megapath, TelePacific and Allied Telecom. Other service providers, such as Verizon, that do not offer their own service often buy wholesale Ethernet services from Ethernet over Copper partners in an arrangement called E-Access.

How big is the Ethernet over Copper market, and how fast is it growing?

According to Infonetics Research, the number of ports deployed for Ethernet over Copper services has been growing at over 20% per year, and this will continue to grow at this pace at least through 2016 (last year of survey). **In fact, each year more copper ports are deployed than fiber ports at a ratio of almost 2:1** (See Figure 3).

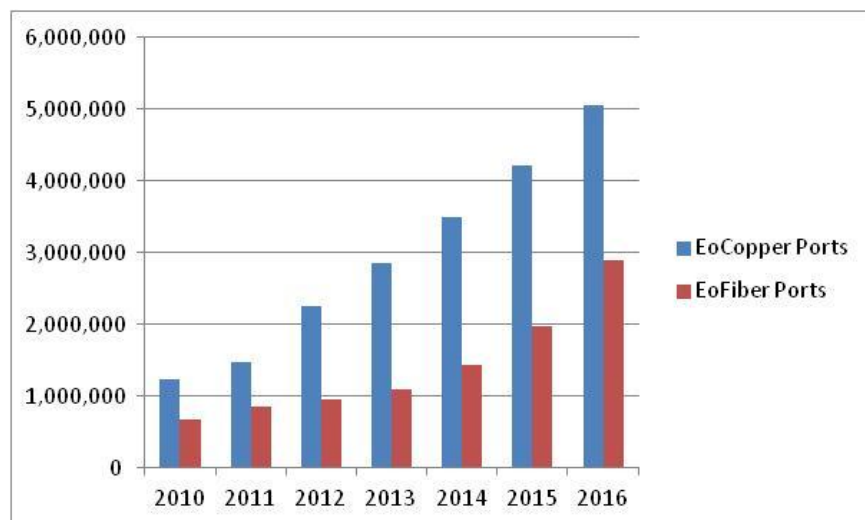


Figure 3 - Ethernet Deployment by Ports

This phenomenon of more copper ports than fiber ports for Ethernet is easy to explain. A company decides to transition to Ethernet/IP based services but only about 32% of its buildings have access to fiber. Rather than sign another 3 year contract to keep its legacy services, the enterprise learns that it can get Ethernet /IP services to all of its locations from a carrier deploying a combination of both fiber and copper technologies. The result is that 2 out of every 3 buildings have the new services delivered by copper.

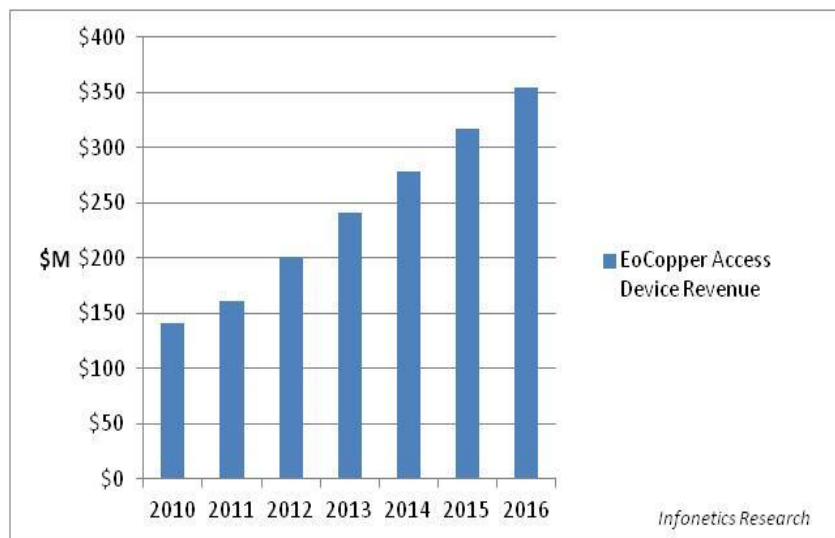


Figure 4 - Ethernet over Copper EAD revenue

When the market is looked at in terms of Carrier Ethernet Access Device (EAD) revenue, the revenue from fiber-based EADs is greater than copper-based EADs, because fiber EADs are more expensive. That said, the Ethernet over Copper EAD market was \$160M in 2011 and is forecasted by Infonetics to grow a healthy 17% per year through 2016 (See Figure 4). In fact, the

copper EAD market is the fastest growing technology in the EAD space.

Are Ethernet over Copper and Fiber mutually exclusive?

No – they are complementary. Forward-looking Service Providers pursue a two-pronged approach for providing high-speed data connections:

- Ethernet over Copper is significantly faster to deploy than fiber, and at a lower cost point.
- Fiber provides higher bandwidth, but is not readily available in many locations (see Figure 1).

These complementary approaches are supported by numerous service providers, as well as by today's multiservice aggregation equipment (see Figure 5).

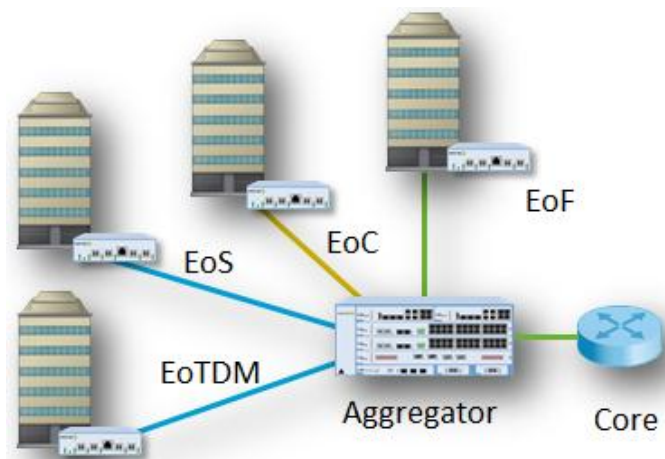


Figure 5 - Multiservice Aggregation

Today, service providers (both ILECs and competitive carriers) are making investments in Ethernet over Copper to support advanced IP services, even in the face of the uncertainty due to the current copper requirement discussions. A ruling to provide more equity and certainty would drive additional innovation and investment.

How does Ethernet over Copper promote innovation?

When entire school districts, medical communities or businesses have access to the speed and flexibility of Carrier Ethernet, whether delivered over fiber or copper, the door opens for innovation. In education, Carrier Ethernet's ability to handle voice, data and video streams on a single network helps fulfill the promise of distance learning and fully networked school systems. In medicine, Carrier Ethernet's high speed and low latency enables physicians to remotely diagnose patients that are tens or hundreds of miles away and would otherwise not receive the

benefit of expert treatment. In finance, the seamless nature of Carrier Ethernet enables distribution of computing and storage resources to provide disaster recovery and critical low latency transactions.

In almost any business, Carrier Ethernet helps remove time and distance barriers, enabling collaboration and productivity within and between companies. Ultimately this creates an environment for innovation, as people expand their circle of connect points and focus their talents on new ideas. The global community becomes more tightly knitted together, accelerating the sharing of knowledge and skills to improve the livelihood of all.

Does Ethernet over Copper accelerate job growth?

The transformation of the network to Ethernet/IP drives job growth in several areas. First, there are the service providers who depend on access to copper in order to promote its most advanced services. Second, there are the equipment manufacturers, such as Overture, Adtran and Actelis (all U.S. based companies), who produce Ethernet over Copper products as part of their network solutions portfolio. Third, there are the end-users that can take advantage of high speed connectivity to make their enterprises more competitive in the global marketplace.

What is happening outside the U.S.?

Ethernet over Copper is growing just as fast outside the U.S. In the U.K., British Telecom has been deploying Ethernet over Copper for wholesale services for a number of years and has more than 11,800 endpoints installed. In Mexico, TelMex has begun a large-scale Ethernet over Copper deployment. Overture is familiar with similar rollouts throughout Europe, Asia and Australia. All of these countries recognize the need to complement their fiber initiatives with copper in order to make available the most bandwidth to the most people in the shortest amount of time.

What happens if copper is retired prematurely?

Some of the ILECs have petitioned the Commission to start retirement of Time Division Multiplexing (“TDM”) services based on the availability of residential class IP services in some locations. We want to ensure that the Commission recognizes that while TDM-based services can be provisioned over copper and fiber, IP-based services can be provisioned over copper and fiber. Therefore, any retirement of services that may rely on outmoded TDM electronics should not promote the retirement of copper loops. As discussed herein, copper loop facilities can be used with state-of-the-art electronics to provision next generation broadband services. Based on the statistics shown above, a premature retirement of unbundled copper loops would have a devastating impact on the availability of advanced IP services for a large portion of the U.S. population.

What other resources are available on using Ethernet over Copper for delivery of IP services?

We have provided a number of attachments to describe some of the services delivered using Ethernet over Copper.

- White Paper: The Complete Executive Handbook: SELLING MID-BAND ETHERNET SERVICES THE CARRIER'S GUIDE TO SELLING MID-BAND ETHERNET SERVICES TO ENTERPRISE CUSTOMERS (provided as Attachment 1 hereto)
- White Paper: Carrier Ethernet Backhaul Strategies (provided as Attachment 2 hereto)
- White Paper: CARRIER ETHERNET FOR CLOUD COMPUTING (provided as Attachment 3 hereto)
- Press Release: PAETEC Successfully Provisions Ethernet over Copper Services Exceeding 200 Mbps (provided as Attachment 4 hereto)
- Press Release: Overture Networks Speeds up Integra Telecom (provided as Attachment 5 hereto)

Summary and Recommendation

For the reasons discussed above, Ethernet over Copper is a significant, widely deployed and growing next generation technology that is critical to the Commission's National Broadband Plan and the migration from legacy to Ethernet/IP services. Any ILEC plan to decommission or retire legacy services which may run on copper (or fiber) should not impact access to copper in feeder facilities or distribution facilities by other service providers. This copper can be and will be used for next generation Ethernet over Copper services and will accelerate achievement of the Commission's broadband goals. Therefore, Overture supports the "Requested Remedy" in TelePacific *et al.*'s January 25, 2013 letter requesting that the Commission "refresh the record" and make certain changes to its copper retirement rules so that all consumers are able to enjoy the benefits of competition and broadband services.

Respectfully submitted,

/s Prayson Pate

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Overture Networks, Inc.

/s M. Vijay Raman

VP of Product Management & Marketing
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Attachments